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Conference Abstract

Updating Species Dictionaries in the Citizen Science Platform iSpotnature.org with the Help of Its User Community and ChecklistBank

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Abstract

The iSpot citizen science platform*[1] allows anyone anywhere to upload images of biodiversity and its community of users helps to identify observations. Key elements of any such system are the species dictionaries that tie together all observations of similar species, allow further information about the taxa to be shown to users and ensure that data collected can be passed on to other recording schemes and global databases.

iSpot was launched in 2009 with the UK Species Inventory (UKSI) database as its UK dictionary and the Catalogue of Life (CoL) for its global dictionary. Later, the South African National Biodiversity Institute (SANBI) dictionary was added (Silvertown et al. 2015). Taxonomy has changed in many species groups since then and missing groups, particularly from the CoL database, are now included. Linking directly to a live version of CoL or UKSI as a web service or similar, had been considered multiple times over iSpot's development timeline but not implemented due to the complexity.

Updating species dictionaries can be a very difficult task. First, these national or international dictionaries are comprised of data from a large number of organisations and individual taxonomists e.g., CoL has global contributions combining taxonomic

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databases in a variety of formats covering various parts of the taxonomic tree. Second, data comes in at various times and there may be differences over the ‘current’ name and possible synonyms.

Third, are issues splitting and aggregating the taxa. Finally, are the number of levels in the taxonomy e.g., are subfamily, subphylum, suborder, used or not. This may differ in data from different organisations, different parts of the tree and may change between overall dictionary versions. In recent years, the use of DNA methods has revolutionised taxonomy in certain groups i.e., fungi; this has not only affected species-level identification but also parts of the higher levels in the tree.

iSpot not only shows the species identification (ID), but also the full taxonomic tree with a built-in species browser. This helps with initial identification and education by showing similar taxa and how an observation fits in with the overall tree of life.

In theory, all that is needed to update the dictionary is to match the taxon codes from the old to the new dictionary, and for the taxon codes that do not match, to attempt to match on taxon name. However, in practice other issues arose e.g., CoL changing all its taxon codes so additional layers of matching are required. Also not just the current name but all the synonyms and homonyms have to be dealt with. The trial included an initial large matchup, done via ChecklistBank, assisted by staff at the Global Biodiversity Information Facility (GBIF) and CoL.

In addition to updating the tree itself, for the system to work, each taxon had to be allocated to an iSpot top level group: amphibians and reptiles, birds, fish, fungi and lichens, invertebrates, mammals, plants and other. For the CoL dictionary, this was a manual process for all five million taxa and synonyms. To facilitate this, the data were written with the full taxonomic hierarchy. This could then be sorted and taxonomic groups added relatively easily.

However, there were still taxa that did not match. This is where the iSpot citizen science community provided help. iSpot volunteers attempted to manually work out matches, for example by checking the spelling. There were some spelling errors that led to lack of match, but other issues were more difficult. In some cases, there were pseudonyms that did not appear in the current dictionary or names that seemed to have vanished completely, but the observation could be redetermined. A common problem was where whole species groups were not present in the new dictionary, which was fed back so that the dictionary could be corrected.

Examples of common groups where some or all species were missing included: ladybird beetles, gall wasps, cockroaches, dragonflies, shield bugs and some moths. The iSpot community involvement demonstrated citizen scientists helping to improve the overall global species dictionary, see example in Table 1.

For each of the 991 instances that volunteer found, notes were provided with references either of the correct taxon to match to or an appropriate higher level group, if the taxon were missing. They also produced notes on, e.g., serious pest species present in the

SANBI dictionary but missing from CoL. Some of the volunteers thought it was too difficult or too much responsibility and dropped out. The results were checked by the iSpot Curator, who also dealt with groups of organisms with no volunteers.

Table 1.

Table 1 Comparison of iSpot SANBI dictionary with new CoL dictionary, manually checked by Amadan (an iSpot volunteer), of insect taxa that were not matched by ChecklistBank.

Present in new CoL dictionary	Count
unclear	33
no	145
yes	813
Grand Total	991

Once the dictionary is updated, information needs to be propagated to all parts of the iSpot platform. During this process some of the manually entered names for taxa, can be automatically linked to the new dictionary.

Keywords

species dictionary, taxonomy

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The OU: Mike Dodd, iSpot Curator, author, methods, community engagement; Chris Valentine, programming; Advaith Siddharthan, advice; Janice Ansine, manager, community engagement; and Markus Doring, use of ChecklistBank.

Conflicts of interest

The authors have declared that no competing interests exist.

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Endnotes

*1 https://www.ispotnature.org/